Listing of the Claims

1. (Previously Presented) A method for a data communications system, the method comprising:

transmitting data in a transport overhead field to at least one network element, the data providing a source identifier and a destination identifier; and

processing the data in the transport overhead field to provide virtual path end-to-end services, wherein

said processing is performed by a route processor.

2. (Original) The method of claim 1 wherein the transport overhead field is a J1 field in a SONET communication packet.

3. (Original) The method of claim 2 wherein the J1 field includes the source identifier and the destination identifier.

4. (Original) The method of claim 1 further comprising:

applying a routing protocol to read the source identifier and the destination identifier.

5. (Previously Presented) The method of claim 1 wherein the virtual path end-to-end services include one or more of routing, provisioning and restoration of functions.

6. (Previously Presented) The method of claim 1 wherein the virtual path end-to-end services are path-level services of a SONET communications network.

7. (Original) The method of claim 1 wherein the method is performed in a communication circuit disposed in one of a synchronous optical network (SONET) and a Synchronous Digital Hierarchy (SDH).

8-9. (Canceled)

10. (Original) The method of claim 1 wherein the data further includes one or more of

transport identification data (TID),

Internet Protocol (IP) addresses,

Common Language Location Information (CLLI) data, and

requests for bandwidth.

11. (Original) The method of claim 1 wherein the data providing the source identifier and the destination identifier avoid manual point-by-point routing of STS-Ns.

12. (Original) The method of claim 1 further comprising:

applying a wavelength routing protocol to the data in the transport overhead field to provide end-to-end services,

the wavelength protocol locating new paths for communication.

13. (Original) The method of claim 12 wherein an intelligent routing software system in combination with the wavelength routing protocol determines end-to-end routing automatically.

14. (Original) The method of claim 12 wherein the wavelength protocol locating new paths for communication is implemented manually.

15. (Previously Presented) An apparatus disposed in a communication system, the apparatus comprising:

means for transmitting data in a transport overhead field to at least one network element, the data providing a source identifier and a destination identifier; and

a route processor means for processing the data in the transport overhead field to provide virtual path end-to-end services.

16. (Original) The apparatus of claim 15 wherein the transport overhead field is a J1 field in a SONET communication packet.

17. (Original) The apparatus of claim 16 wherein the J1 field includes the source identifier and the destination identifier.

18. (Original) The apparatus of claim 15 further comprising:

means for applying a routing protocol to read the source identifier and the destination identifier.

19. (Previously Presented) The apparatus of claim 15 wherein the virtual path end-to-end services include one or more of routing, provisioning and restoration of functions.

20. (Previously Presented) The apparatus of claim 15 wherein the virtual path end-to-end services are path-level services of a SONET communications network.

21. (Original) The apparatus of claim 15 wherein the apparatus includes a communication circuit disposed in one of a synchronous optical network (SONET) and a Synchronous Digital Hierarchy (SDH).

22-23. (Canceled)

24. (Original) The apparatus of claim 15 wherein the data further includes one or more of

transport identification data (TID),

Internet Protocol (IP) addresses,

Common Language Location Information (CLLI) data, and

requests for bandwidth.

25. (Original) The apparatus of claim 15 wherein the data providing the source identifier and the destination identifier avoids manual point-by-point routing of STS-Ns.

26. (Original) The apparatus of claim 15 further comprising:

means for applying a wavelength routing protocol to the data in the transport overhead field to provide end-to-end services,

the wavelength protocol locating new paths for communication.

27. (Original) The apparatus of claim 26 wherein an intelligent routing software system in combination with the wavelength routing protocol determines end-to-end routing automatically.

28. (Original) The apparatus of claim 26 wherein the wavelength protocol locates new paths for communication manually.

29. (Currently Amended) A computer program product for communication, the computer program product comprising:

a first set of instructions, executable on a processor, configured to transmit data in a transport overhead field to at least one network element, the data providing a source identifier and a destination identifier; and

a second set of instructions, executable on a router processor, configured to use the data in the transport overhead field to provide virtual path end-to-end services.

30. (Previously Presented) A method for a data communications system, the method comprising:

receiving data in a transport overhead field by at least one network element, the data providing a source identifier and a destination identifier; and

processing the data in the transport overhead field to provide virtual path end-to-end services, wherein

said processing is performed by a route processor.

31. (Previously Presented) The method of claim 30 wherein the transport overhead field is a J1 field in a SONET communication packet.

32. (Previously Presented) The method of claim 31 wherein the J1 field includes the source identifier and the destination identifier.

33. (Previously Presented) The method of claim 30 further comprising:

applying a routing protocol to read the source identifier and the destination identifier.

34. (Previously Presented) The method of claim 30 wherein the virtual path end-to-end services include one or more of routing, provisioning and restoration of functions.

35. (Previously Presented) The method of claim 30 wherein the virtual path end-to-end services are path-level services of a SONET communications network.

36. (Previously Presented) The method of claim 30 wherein
the method is performed in a communication circuit disposed in one of a synchronous optical network (SONET) and a Synchronous Digital Hierarchy (SDH).

37-38. (Canceled)

39. (Previously Presented) The method of claim 30 wherein the data further includes one or more of
transport identification data (TID),
Internet Protocol (IP) addresses,
Common Language Location Information (CLLI) data, and
requests for bandwidth.

40. (Previously Presented) The method of claim 30 wherein the data providing the source identifier and the destination identifier avoid manual point-by-point routing of STS-Ns.

41. (Previously Presented) The method of claim 30 further comprising:
applying a wavelength routing protocol to the data in the transport overhead field to provide end-to-end services,
the wavelength protocol locating new paths for communication.

42. (Previously Presented) The method of claim 41 wherein an intelligent routing software system in combination with the wavelength routing protocol determines end-to-end routing automatically.

43. (Previously Presented) The method of claim 41 wherein the wavelength protocol locating new paths for communication is implemented manually.

44. (Previously Presented) An apparatus disposed in a communication system, the apparatus comprising:

a receiver network element configured to receive data in a transport overhead field from at least one transmitting network element,

the data providing a source identifier and a destination identifier; and

a route processor configured to process the data in the transport overhead field to provide virtual path end-to-end services.

45. (Previously Presented) The apparatus of claim 44 wherein the transport overhead field is a J1 field in a SONET communication packet.

46. (Previously Presented) The apparatus of claim 45 wherein the J1 field includes the source identifier and the destination identifier.

47. (Previously Presented) The apparatus of claim 44 wherein the receiver applies a routing protocol to read the source identifier and the destination identifier.

48. (Previously Presented) The apparatus of claim 44 wherein the virtual path end-to-end services include one or more of

routing,

provisioning, and

restoration of functions.

49. (Previously Presented) The apparatus of claim 44 wherein the virtual path end-to-end services are path-level services of a SONET communications network.

50. (Previously Presented) The apparatus of claim 44 wherein the data further includes one or more of

transport identification data (TID),

Internet Protocol (IP) addresses,

Common Language Location Information (CLLI) data, and

requests for bandwidth.

51. (Previously Presented) The apparatus of claim 44 wherein the data providing the source identifier and the destination identifier avoids manual point-by-point routing of STS-Ns.

52. (Previously Presented) The apparatus of claim 44 further comprising:

means for applying a wavelength routing protocol to the data in the transport overhead field to provide end-to-end services,

the wavelength protocol locating new paths for communication.

53. (Previously Presented) The apparatus of claim 52 wherein

an intelligent routing software system in combination with the wavelength routing protocol determines end-to-end routing automatically.

54. (Previously Presented) The apparatus of claim 52 wherein the wavelength protocol locates new paths for communication manually.

55. (Previously Presented) The method of Claim 1 wherein said processing comprises:

interpreting a failure indication from a network element in a failed virtual path;

calculating a new virtual path to replace the failed virtual path; and

providing an indication of the new virtual path to an affected network element.

56. (Previously Presented) The method of Claim 1 wherein said processing comprises:

calculating a virtual path from a network element corresponding to the source identifier to a network element corresponding to the destination identifier.

57. (Previously Presented) The method of Claim 15 wherein said means for processing comprises:

means for interpreting a failure indication from a network element in a failed virtual path;

means for calculating a new virtual path to replace the failed virtual path; and

means for providing an indication of the new virtual path to an affected network element.

58. (Previously Presented) The method of Claim 15 wherein said means for processing comprises:

means for calculating a virtual path from a network element corresponding to the source identifier to a network element corresponding to the destination identifier.

59. (Previously Presented) The method of Claim 30 wherein said processing comprises:

interpreting a failure indication from a network element in a failed virtual path;

calculating a new virtual path to replace the failed virtual path; and

providing an indication of the new virtual path to an affected network element.

60. (Previously Presented) The method of Claim 30 wherein said processing comprises:

calculating a virtual path from a network element corresponding to the source identifier to a network element corresponding to the destination identifier.

61. (Previously Presented) The apparatus of Claim 44 wherein the route processor is further configured to:

interpret a failure indication from a network element in a failed virtual path;

calculate a new virtual path to replace the failed virtual path; and

provide an indication of the new virtual path to an affected network element.

62. (Previously Presented) The apparatus of Claim 44 wherein the route processor is further configured to:

calculate a virtual path from a network element corresponding to the source identifier to a network element corresponding to the destination identifier.